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TECHNICAL REPORT ECOM-01336-3

DEVELOPMENT OF A LIGHTWEIGHT, CABLE DRIVEN TELESCOPIC MAST

QUARTERLY REPORT

BY
J.R. HARRIS

JULY 1966

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Technical Report ECOM-01336-3

July 1966

**Development of a Lightweight
Cable Driven, Telescopic Mast**

Quarterly Report

29 October 1965 to 28 April 1966

Report No. 3

Contract No. DA28-043-AMC-01336(E)

DA Task No. 1G6 40306 D 488

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For

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ABSTRACT

This report covers the progress made in the development of a manually actuated, cable driven, telescopic antenna mast, which will meet the requirements of Specification SCL-7805. The mast and its operation is reviewed.

Fabrication of the initial units was delayed approximately fifteen weeks due to a strike of the hourly employees. Three masts have been completed and are being tested. Static load tests have been completed; environmental and cycling tests are approximately 40% complete.

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GENERAL DESCRIPTION

This quarterly report covers the progress made in the development of a manually actuated, cable driven, telescopic mast, Mast AB-903/G, in accordance with Technical Requirement SCL-7805 dated 17 March 1964 and Amendment No. 1 dated 13 July 1965. The six month period covered, 29 October 1965 to 28 April 1966, includes a fifteen week period when progress was limited because of a strike of hourly employees.

The mast is designed to support Antenna AS-1729 and other whip-type antennas used with tactical communications equipment. It is capable of elevation to any height between six feet and thirty feet above the mast base. (See Figure I). The mast is capable of erection and retraction at an angle of 7° with the vertical in winds up to thirty-five miles per hour without guy support, and will survive fifty mile per hour winds with upper guy supports attached. The cable driven mast sections are positively driven up or down with a closed cable routing system illustrated in Figure II. The weight of the mast and its accessories is 45.5 pounds.

The mast is capable of being either ground or vehicular mounted. When ground mounted, it is inserted in a base plate and held vertical by three guy assemblies. It can be erected by two trained men in approximately five minutes.

Mounting bracketry and hardware is provided for installing the mast on the following vehicles.

Carrier, Command Post, light tracked, M577.

Carrier, Command Reconnaissance armored, M114A1/M114.

Truck, 3/4 ton, 4 x 4, M37.

Truck, 2 1/2 ton, 6 x 6, M109.

Truck, 1/4 ton, 4 x 4, M38A1.

The mast can be operated manually using a hand crank attached to the winch, or electrically with an adjunctive motor drive unit which can be mounted to the winch. The motor drive unit consists of a 22 to 28 volt DC motor, a gear reduction unit and integral controls necessary to permit remote operation of the mast. The drive motor package weighs an additional 11.3 pounds.

PROGRESS

The requirements of this contract have been divided into the following three major tasks:

TASK A - DESIGN

- Phase 1 - Design Plan
- Phase 2 - Test Plan
- Phase 3 - Fabrication Drawings

TASK B - INITIAL SERVICE TEST MODELS

- Phase 1 - Fabrication
- Phase 2 - Instruction Manuals
- Phase 3 - Test Program

TASK C - FINAL SERVICE TEST MODELS

- Phase 1 - Fabrication
- Phase 2 - Spare Parts List
- Phase 3 - Final Report

Progress has been made as follows:

TASK A -

- Phase 1 The Design Plan was submitted 30 June 1965, amended 21 September and approved by USAEL 14 October 1965.
- Phase 2 The Test Plan was submitted on 27 July 1965, revised on 17 September 1965 and approved by USAEL 6 October 1965.
- Phase 3 Fabrication drawings have been completed, released for fabrication, and revised for fabrication of the Service Test Models.

TASK B -

Phase 1

Complete - some minor rework was required to correct deficiencies that occurred during the test program.

The 1/8 inch diameter pin used to install the winch drive gear failed. The pin was replaced by a 5/32 inch diameter pin.

The winch gears were changed from full tooth, 14 1/2° pressure angle to stub tooth, 20° pressure angle.

The pins used to retain the cables on the pulleys were relocated closer to the O.D. of the pulleys to prevent the cable from slipping off.

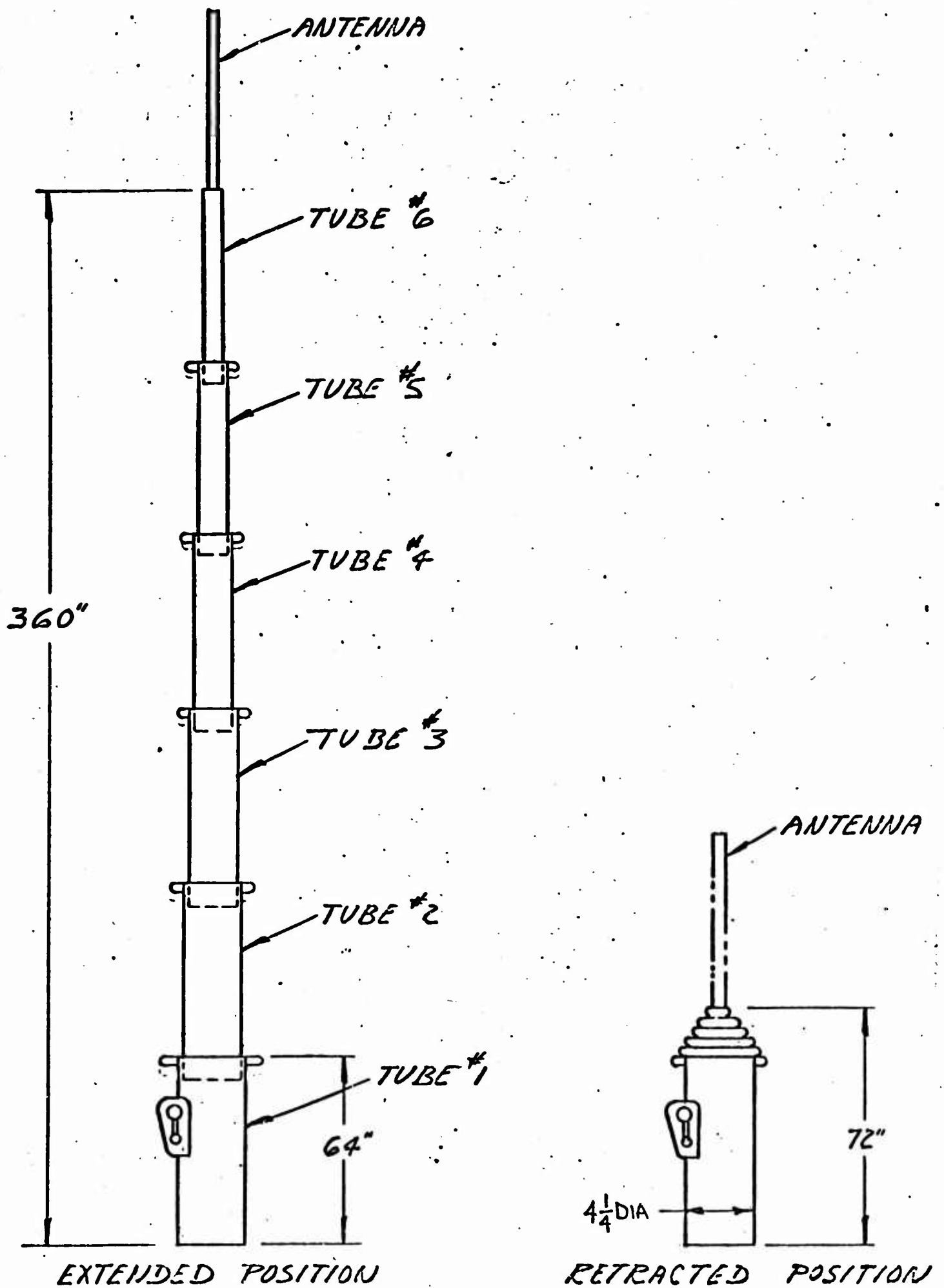
The lifting cable at the lower end of tube #2 was rerouted to prevent cable fatigue and excessive cable stretch.

Phase 2

Preliminary draft copies of the Instruction Manuals was submitted February 2, 1966. Comments on the draft were received April 18, 1966. Corrective action is being taken toward completion of this item.

Phase 3

Static testing of the mast under simulated wind loading condition is completed. The time required to hand crank the mast to full height, crank handle forces, and the deflection of the mast were all within specified limits. Tests are continuing on the adjunctive drive motor kit, environmental testing and cycling.



MAST ASSEMBLY

FIGURE I

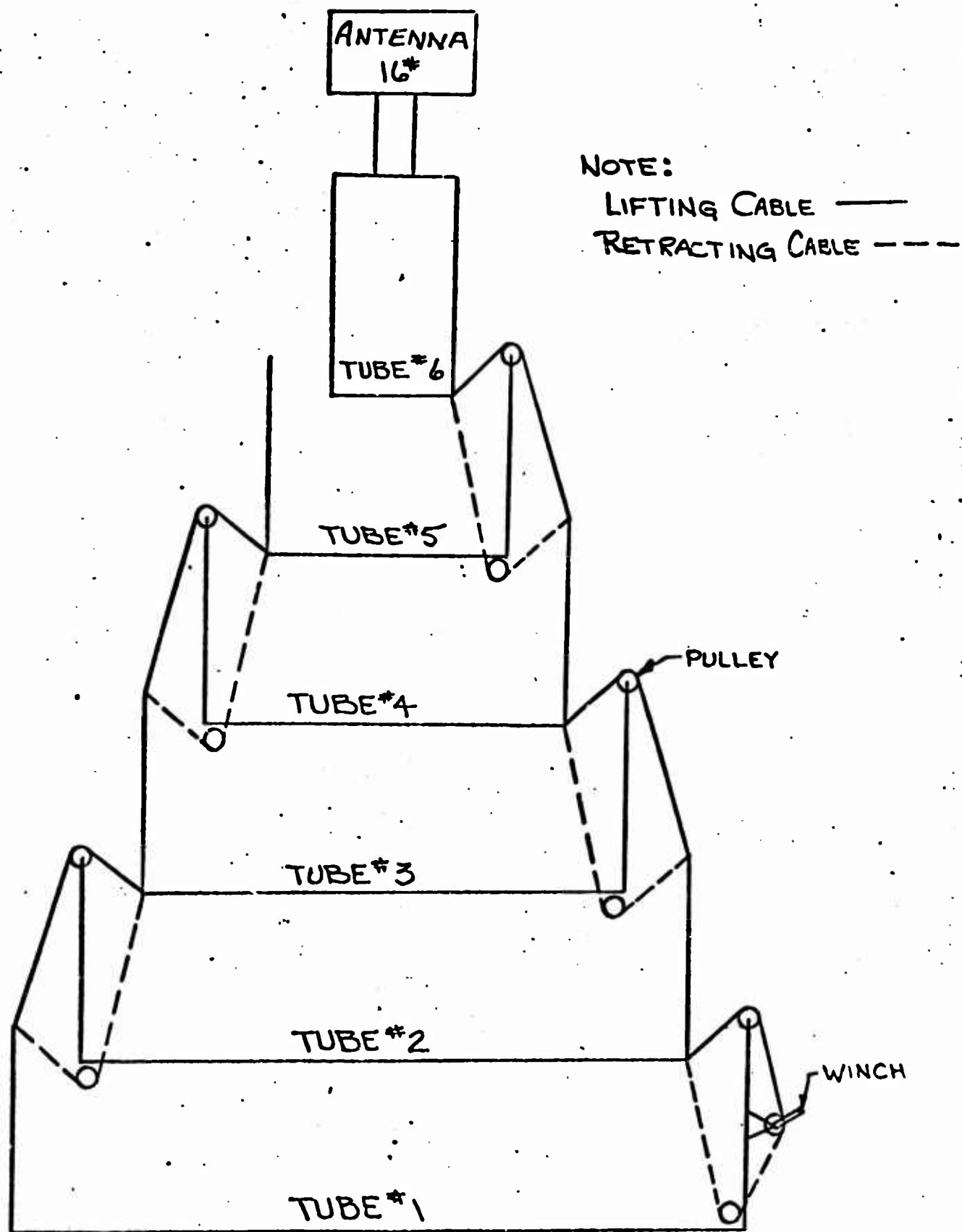


FIGURE II
 CABLE & PULLEY CONFIGURATION

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Mast AB903/G						
Antenna Support						
Vehicular Installation						
Motor Operated						

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